

11



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/819,688	03/29/2001	Eiji Natori	109120	3149

25944 7590 06/09/2003

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

HOGANS, DAVID L

ART UNIT	PAPER NUMBER
----------	--------------

2813

DATE MAILED: 06/09/2003

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/819,688

Applicant(s)

NATORI, EIJI

Examiner

David L. Hogans

Art Unit

2813

-- The MAILING DATE of this communicati n appears on the cover she t with the c rrespondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 31 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) 18-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Request for Reconsideration filed on May 31, 2003.

Status of Claims

Claims 1-13 and 15-17 are pending. Claim 14 has been cancelled. Claims 18-33 are withdrawn.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4 and 6-11 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,110,531 to Paz de Araujo et al. (hereinafter Paz).

Claim 1

In reference to Claim 1, Paz et al. teaches:

- a method of mixing a ferroelectric precursor with an active species and applying the film by a misted CVD process (See column 5 lines 21-30 and lines 45-56, columns 13-14 lines 50-10 and Figure 3)

Claim 4

In reference to Claim 4, Paz et al. teaches:

- electrically charging the fine particles (136 and 137) (See Figure 3 and column 8 lines 8-30)

Claim 6

In reference to Claim 6, Paz et al. teaches:

- the active species is a radical or ion (136 and 137) (See Figure 3 and column 5 lines 21-30 and column 8 lines 8-30)

Claim 7

In reference to Claim 7, Paz et al. teaches:

- the active species is radical or ion (136 and 137) of the raw material species (113A, B or C) (See Figure 3 and column 5 lines 21-30 and column 8 lines 8-30)

Claim 8

In reference to Claim 8, Paz et al. teaches:

- the active species is an ion of oxygen (112C) or nitrogen (112B) (See Figure 3)

Claims 9 and 10

In reference to Claims 9 and 10, Paz et al. teaches:

- the active species is an ion or radical of inert argon gas (112A) (See Figure 3)

Claim 11

In reference to Claim 11, Paz et al. teaches:

- the active species is fed to the substrate in an accelerated state (136 and 137)

(See Figure 3)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 5 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,232,167 to Satoh et al. in view of 5,456,945 to McMillan et al.

Claim 1

Satoh et al. teaches a ceramic material formed on a substrate by heating and vaporizing Bismuth raw material and mixing it with Argon and Oxygen gas for deposition on a substrate. (See column 7 lines 14-26 and column 8 lines 35-60)

Satoh et al. fails to explicitly teach forming the ceramic film by LSMCD or a misted CVD process.

However, McMillan et al, in column 4 lines 55-60 and column 8 lines 10-25, teaches a ferroelectric layer that is deposited by a misted CVD process. Further, McMillan teaches that high quality complex thin films (@ 200 Å), such as ferroelectric films, can be readily achieved by the misted CVD process. (See column 6 lines 35-45 and column 7 lines 50-55)

It would have been obvious to one of ordinary skill in the art to modify Satoh et al. by incorporating deposition of a ferroelectric film by misted CVD, as taught by McMillan et al., to produce high quality thin ferroelectric films (@ 200 Å).

Claim 2

Incorporating all arguments of Claim 1 and noting that Satoh et al. teaches a diameter of fine raw material that is 50 nm (See column 9 lines 1-5)

Claim 5

Incorporating all arguments of Claim 1 and noting that Satoh et al. teaches a fine particle raw material that is gasified before mixing with the reaction gas (See column 7 lines 16-20 and column 8 lines 35-60)

Claim 15

Incorporating all arguments of Claim 1 and noting that Satoh et al. teaches the ceramic film is a dielectric (See Figure 1 and column 11 lines 35-47)

Claims 16 and 17

Incorporating all arguments of Claim 1 and noting that Satoh et al. teaches a dielectric formed at 400 °C (See column 8 lines 57-59 and column 9 lines 53-61)

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,232,167 to Satoh et al. in view of 5,456,945 to McMillan et al. further in view of 6,146,905 to Chivukula et al.

Claim 3

Incorporating all arguments of Claim 1 above and noting that Satoh et al. and McMillan et al. fail to explicitly teach a diameter of fine particle that is 0.01 micrometer or less.

However, Chivukula et al., in column 6 lines 37-40, teaches a particle diameter of 10 nm. Further, Chivukula et al. discloses that a superior high frequency response is noted in integrated circuits that are formed from reproducible small grain size ferroelectric layers.

It would have been obvious to one of ordinary skill in the art to modify Satoh et al. and McMillan et al. by incorporating a ferroelectric particle diameter of 10 nm, as taught by Chivukula et al., to produce a superior high frequency response in ferroelectric films.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,232,167 to Satoh et al. in view of 5,456,945 to McMillan et al. further in view of 5,563,762 to Leung et al.

Incorporating all arguments of Claim 1 and noting that Satoh et al. and McMillan et al. fail to explicitly teach a ceramic film formed on part of a substrate.

However, Leung et al., in Figure 3 and column 8 lines 25-30, teaches a ferroelectric dielectric material that is selectively deposited on a bottom electrode. Further, Leung et al. teaches the selective deposition so that an isolated capacitor structure may be made.

It would have been obvious to one of ordinary skill in the art to modify Satoh et al. and Mcmillan et al. by incorporating selective deposition of a ferroelectric film, as taught by Leung et al., to create an isolated capacitor structure.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,232,167 to Satoh et al. in view of 5,456,945 to McMillan et al. in view of 5,563,762 to Leung et al. further in view of 5,932,904 to Hsu et al and further in view of 6,207,236 to Araki et al.

Incorporating all arguments of Claim 1 and noting that Satoh et al., McMillan et al. and Leung et al. fail to explicitly teach a film-forming region on a substrate having an affinity for ceramics with a non-film-forming region having no affinity for ceramics.

However, Leung et al., in Figure 3 and column 8 lines 25-30, teaches a ferroelectric dielectric material that is selectively deposited on a bottom electrode. Further, Hsu et al., in column 4 lines 20-25, teaches that Iridium or Iridium Oxide is a suitable conductive material to deposit a ferroelectric layer upon. Furthermore, Araki et al., in column 4 lines 11-33, teaches that fluorine containing compounds have excellent non-sticking property when used as a coating compound. Such functional use of Iridium or Iridium Oxide as a suitable conductive material, such selective deposition as taught by Leung et al., and such non-sticking properties of Fluorine containing material as taught by Araki et al., renders these applications obvious to Satoh et al. and McMillan et al.

It would have been obvious to one of ordinary skill in the art to modify Satoh et al., McMillan et al. and Leung et al. by incorporating the selective deposition of a ferroelectric material upon Iridium or Iridium Oxide and not upon a Fluorine containing compound, as taught by Hsu et al. and Araki et al., to selectively deposit a ferroelectric film on a microelectronic structure.

Response to Arguments

5. Applicant's arguments filed May 31, 2003, have been fully considered but they are not persuasive.

Claims 1, 4 and 6-11

The Applicant portends that 6,110,531 to Paz de Araujo et al. (hereinafter Paz) fails to teach Claims 1, 4 and 6-10. The crux of Applicant's arguments is that the carrier gas of Paz et al. cannot be the active species recited in Applicant's Claim 1. The Applicant argues that the carrier gas of Paz et al. does not provide kinetic energy to the raw material gas and, as such, is not deemed active. The Examiner maintains that Paz et al. teaches an active species and refers the Applicant to the rejection of Claim 1 provided above for verification. The Examiner further notes that Paz et al. teaches the following: column 3 lines 10-15 teaches an ICP excitation of the reactant gases to overcome kinetic barriers to reaction, column 5 lines 20-30 teaches an "active" species, and Figure 3 denotes a plasma generator (136) coupled to the reaction chamber. Therefore, the Examiner maintains that Paz et al. teaches an active species of oxygen, nitrogen or argon, as enumerated by Applicant's specification on page 7, that can be combined with a raw material gas so as to deposit a ceramic film.

Claims 1, 2, 5 and 15-17

The Applicant portends that 6,232,167 to Satoh et al. and 5,456,945 to McMillian et al. fail to teach Applicant's Claims 1, 2, 5 and 15-17. The Applicant argues that

neither reference teaches an active species that is mixed with a fine particle of a raw material. Initially, the Examiner notes that McMillian et al. need not teach an active species because Satoh et al. does. The Examiner maintains that Satoh et al. teaches an active species. Merriam Webster's Collegiate Dictionary, tenth edition, defines active as something capable of acting or reacting. As such, the Examiner deems an "active species" as any matter that may react with other matter. As the oxygen reacts with the bismuth and titanium to form bismuth titanate, it is an active species. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., that the active species possess a high kinetic energy) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

As to Applicant's argument that McMillian et al. actually teaches away from using an active species, the Examiner disagrees. The Examiner notes that in Figure 1 and column 9 lines 5-20, McMillian et al., teaches a DC bias voltage applied between the substrate holder (4) and the barrier plate (6). Therefore, McMillian et al. teaches that a misted CVD process can be used within an electric field.

Claims 3, 12 and 13

The Applicant portends that 6,146,905 to Chivukula et al., 5,563,762 to Leung et al., 5,932,904 to Hsu et al. and 6,207,236 to Araki et al. fail to overcome the deficiencies of Satoh et al. and McMillian et al. The Examiner refers the Applicant to the above discussion concerning Claims 1, 2, 5 and 15-17 concerning Satoh et al. in view of McMillian et al.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (703) 305-3361. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (703) 308-4940. The fax phone

Art Unit: 2813

numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

dh *DA*
June 4, 2003

Carl Whitehead, Jr.
CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800